

SECTION 23 8326

RADIANT FLOOR HEATING SYSTEMS

This section includes editing notes to assist the user in editing the section to suit project requirements. These notes are included as hidden text, and can be revealed or hidden by one of the following methods:

Microsoft Word 2007: Click the OFFICE button, select WORD OPTIONS, select DISPLAY, then select or deselect the HIDDEN TEXT option.

Microsoft Word (earlier versions): From the pull-down menus select TOOLS, then OPTIONS. Under the tab labeled VIEW, select or deselect the HIDDEN TEXT option.

Corel WordPerfect: From the pull-down menus select VIEW, then select or deselect the HIDDEN TEXT option.

1. GENERAL

1. SUMMARY

A. Section Includes:

1. Radiant floor heating system.
2. Thermostat controls.
3. Connection to power supply.

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section [03 3000 - Cast-In-Place Concrete:] [__ ____ - ____:] Concrete subfloor.
3. Section [06 1100 - Framing and Sheathing:] [__ ____ - ____:] Wood floor framing and decking.
4. Section [09 3000 - Tiling:] [__ ____ - ____:] Tile setting bed and floor finish.
5. Section [09 6340 - Stone Flooring:] [__ ____ - ____:] Stone setting bed and floor finish.

2. REFERENCES

- A. Canadian Standards Association (CSA) - Canadian Electrical Code
- B. National Fire Protection Association (NFPA) 70 - National Electrical Code.
- C. Underwriters Laboratories, Inc. (UL) - Product Directories.

3. SUBMITTALS

A. Submittals for Review:

1. Shop Drawings: Include plans with heating [panel] [cable] layout, [panel sizes,] and power supply locations.
2. Product Data: Manufacturer's descriptive data for [panels] [cables] and accessories, including electrical characteristics.

4. QUALITY ASSURANCE

- A. Installer Qualifications: Minimum [2] [__] years [documented] experience in work of this Section.
- B. Electrical Products: Tested by Underwriters Laboratories, Inc.
 1. Bear UL Listing Mark.
 2. Listed in UL Product Directory.

**** OR ****

- C. Electrical Products: Certified by CSA.

**** OR ****

D. Electrical Products: Certified by an independent laboratory approved by authorities having jurisdiction.

5. DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle products in manner to prevent damage.

6. WARRANTIES

A. Furnish manufacturer's [5] [10] [20] year warranty providing coverage against defects in materials and workmanship.

2. PRODUCTS

2.1. MANUFACTURERS

A. Contract Documents are based on products by Therma-Ray (www.thermaray.com).

B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

2.2. COMPONENTS

A. Radiant Floor Warming Cable System:

1. Factory fabricated electrical heating cables.
2. Utilize alloy resistance wire element, electrically insulated, rated to 250 degrees C.
3. Factory-made waterproof splice connections for each non-heating lead to resistance wire.
4. Complete heating element covered with stainless steel braid over entire length.
5. Produce two watts per linear foot when energized on design voltage.
6. Model: No. [____], 120 VAC, or 240 VAC, [] watts, [] feet long x [] inches wide.
7. Spacing strips: Manufacturer's standard.
8. Controls: No. SR-240/120 SmartRooms Comfort Controller, 240/120 volts, with sensors and built-in GFCI.

2.3. ACCESSORIES

A. Setting Bed: Specified in Section [09 3000.] [09 6340.] [__ ____.]

3. EXECUTION

3.1. INSTALLATION

A. Install cables and accessories in accordance with manufacturer's instructions, approved Shop Drawings, and [NFPA 70.] [Canadian Electrical Code.]

B. Lay out system to locate cables:

1. 1/2 to 1 inch from undersides of counters, steps, bathtubs, showers and other fixed objects.
2. 2 inches from walls and partitions.
3. 6 inches from toilets and faucets.
4. 8 inches from other heating systems installed at base of walls and partitions or in floor.

C. Attach cable to floor using spacing strip starting at connection box.

D. Attach green clip from S.I.D. to steel braid; leave on during installation. Attach black and red clips to non-heating lead wire.

E. Place cables with manufacturer's recommended distance between cables; apply slight tension to cable to ensure that cable is parallel.

F. Secure cable with staples or construction adhesive when required to prevent shifting during mortar placement.

- G. Install all heating portions of cable on floor.
- H. Allow sufficient space for cable return to connection box.
- I. After all cable has been installed, test cable to verify ohms and for grounding.
- J. Install controller probe wire between cables at 1 to 2 foot intervals within heating zone. Secure probes with glue, staples, or tape. Do not cross probe wires over warming cables.
- K. Embed cables in full mortar bed.
- L. Locate thermostat controls [where indicated.] [____.]
- M. Ground stainless steel braid to the electrical ground wire.
- N. Connect to power supply and control wiring.
- O. Test system after mortar bed is applied, after tiles are installed but before grouting, and after grouting at rated voltage using ammeter. Ensure that ammeter values are same as calculated for heating load.

END OF SECTION



Whether you're a contractor, architect, builder or homeowner, creating the perfect indoor environment has always been a challenge. ThermaRay, the world's #1 name in thermal comfort systems introduces you to the ultimate floor heating solution. Please take the time to read this installation guide carefully before you begin. Remember, accurate measurements are the key to success for a proper installation.

FLOOR WARMING SYSTEM Installation Guide

FLOOR SURFACE VERIFICATION

- ThermaRay's Floor Warming System can be installed on plywood, concrete, existing tiles, or any compatible floor surface.
- ThermaRay's Floor Warming System is ideal under almost any floor covering, like natural stone, ceramic, marble, granite, or any other considered cold surface. It can also be installed under a floating floor, or an engineered wood floor.
- Your floor surface should be clean, free of protruding nails, screw heads, grease, plastering dust, or any other materials that may damage the cable and/or affect the floor adhesive.
- Please refer to the adhesive manufacturer's directions for any other necessary preparations of the floor surface.

NECESSARY TOOLS

Measuring tape, snipper, hot glue gun, ohmmeter, and S.I.D. (Smart Installation Detector) (to verify the integrity of the cable and to test for grounding). Keeping S.I.D. connected during installation will allow you to detect problems immediately. S.I.D. comes with its own simple operating instructions.

PLANNING

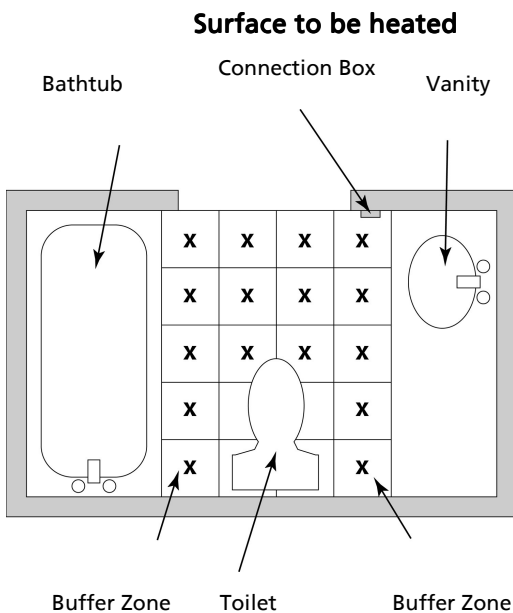
To minimize time and error, measure the real surface of the floor to be heated, then compare your measurement with the selected cable. The selected cable should be 5% smaller in surface area than the total area of the floor to be heated. This will create a buffer zone which can be used to accept any excess cable if necessary. You start and finish at the connection box. You will have a white floor lead wire and a black lead wire in the connection (electrical) box. Therefore, you must plan your lay-out to finish where you started, at the electrical box.

CAUTION: ThermaRay's warming cable is an electrical product and should be installed according to the electrical code. The installation should be done by a duly qualified person where required by law.

IMPORTANT

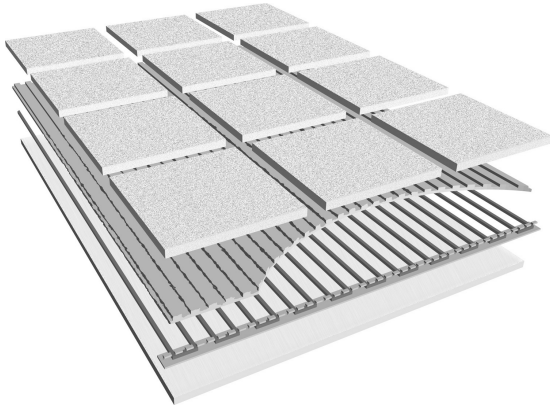
The heating cable cannot be cut, overlapped, crossed, modified, nor can the spacing between the cables be altered other than that determined by the selected Therma-Ray spacing strip i.e., 50 mm (2"), 75mm (3") or 100 mm (4").

NOTE: Cable cannot be at 25 mm (1") spacing.



Example: 16 sq. ft. use Model FW12

In this example, each square is a 12" tile. There are 16 tiles or 16 square feet. You use the model number that comes closest but doesn't exceed the square footage. The correct model is a FW12. An FW12 will cover between 12 and 17 square feet. Since the spacing strips allow for great flexibility, you can increase the wire coverage from two-inch spacing to three-inch spacing or vice-versa. Changing the spacing can be done at any point during installation.



Only certain floor coverings may be used with your ThermaRay floor warming system. Such as hard surface tile, marble, ceramic, and stone. To ensure the flooring material you are using is compatible, please contact a ThermaRay representative.

1. Floor covering
2. Adhesive
3. ThermaRay heating system with Spacing Strip
4. Sub-floor

NOTE: Cables must be embedded in mortar of cementitious material suitable for direct contact with heating cable. Use a premium latex modified mortar. Please refer to the specific manufacturer's directions in regard to floor warming installation.

IMPORTANT

ThermaRay's warming cable can be installed at:

- 13 to 25 mm (1/2 to 1 inch) from any underside of a counter, steps, fixed furniture, patio doors, baths, or showers.
- 5 cm (2 inches) from any walls.
- 15 cm (6 inches) from toilet / faucets.
- 20 cm (8 inches) from any other heating system installed at the base of the wall or in the floor.

Do Not:

- Install under fixed furniture or where the air does not flow freely.
- Use rubber mat (rubber is an insulator and will affect the efficiency of the system).
- Fix anything to the floor (i.e. door stopper).

INSTALLATION

Now that you have checked your floor and have determined that your heated cable matches your floor dimensions, you are ready for the installation.



OHMS

Diagram 1

Spacing Strip

Connection Box

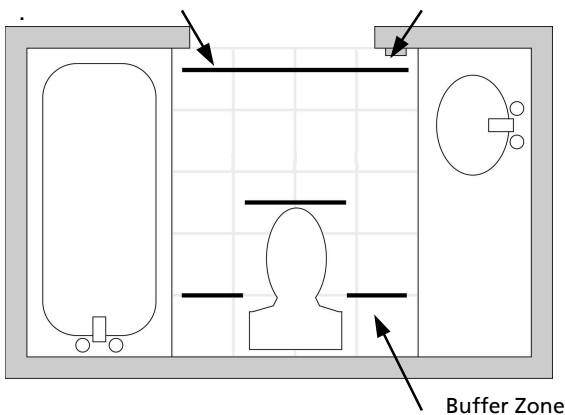


Diagram 2

Step 1:

Determine where the connection box will be installed. Then open the carton and test the ohms to ensure they match the ohms label on the wire (*see Diagram 1*). At the end of each cable is a 2.1 metre (7 foot) cold lead to make the appropriate electrical connections.

Step 2:

Fix the cable to the floor using the spacing strip starting at the connection box. (*see Diagram 2*). Attach the green clip from S.I.D. to the steel braid. Leave on during installation. Attach the black and red clips to the non-heating lead wire. (See S.I.D. instructions for further detail.)

Note: ThermaRay's spacing strip is the only approved product for spacing the cable on the floor. Install the spacing strip to the floor as the installation progresses.

If necessary, to secure the spacing strip, you can use staples or construction adhesive.

Step 3:

Respect the distance between cables and apply a slight tension to the cable to ensure that the cable is always parallel (*see Diagram 3*). You may want to glue or staple (carefully using round electrician staples) on long runs to keep the wire from floating when the latex mortar is poured.

Step 4:

All heating portions of the cable must be installed on the floor. Once you see colored tape, you have reached the half way point of your installation.

Step 5:

Allow sufficient space for the cable return. The cable starts and ends at the connection box. Once all the cable has been installed, test the cable to verify the ohms (*see Diagram 1*) and for grounding. This is done by connecting one lead from the ohmmeter to the wire and the other lead to the stainless-steel braid. Any reading other than a 1 or 0 means the cable has been damaged. To verify continuity, touch probe of the ohm meter to each lead wire. The ohm reading should be in the same range as marked on the tag. S.I.D. can also be used. It has its own simple instructions.

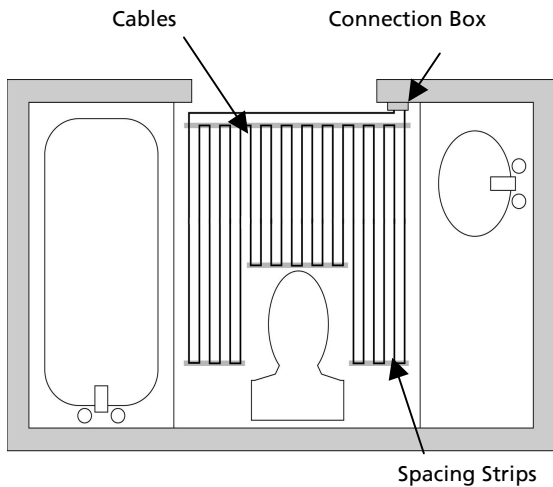


Diagram 3

NOTE:

If the installation requires many cables, each run of the cable should be carefully planned to ensure that the spacing between the cables is always respected (**See Diagram 4**).

Step 6

Install the floor sensor for your thermostat between the heating cables at a distance of 30 to 60 cm (1 to 2 feet) within the heating zone (**see Diagram 5**). You may anchor the sensor with glue, staple (rounded) or tape.

Note: Do not cross the sensor wire over the heating cable. The floor sensor should be placed in a neutral zone, not near any heating or cooling source.

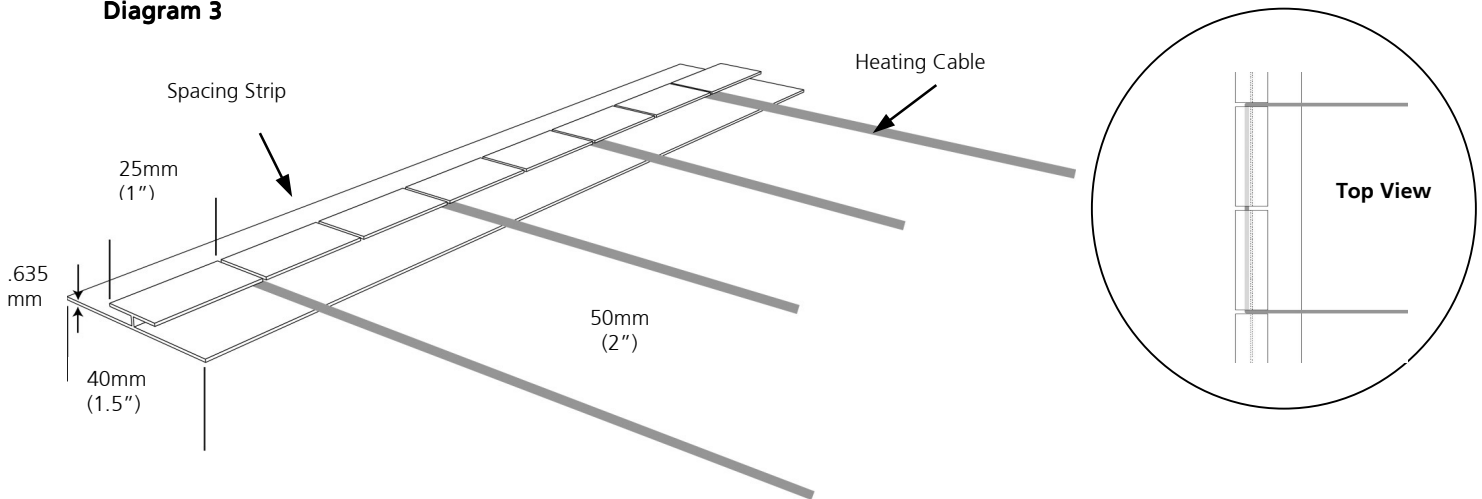


Diagram 4. Grooves for wires are every 25mm (1"). Do not place wire at 25mm (1") spacing. You may place wire every 50mm (2") or 75mm (3") apart or in combination depending on heat design.

Step 7

Once the adhesive or self-levelling cement has been applied, test the cable as per step 5.

Step 8

Once the tiles are installed, test the cable again as outlined in step 5.

Step 9

Once the grout is applied (the tile installation should now be complete) test the cable again as outlined in step 5.

NOTE: The stainless-steel braid must be grounded to the electrical ground wire.

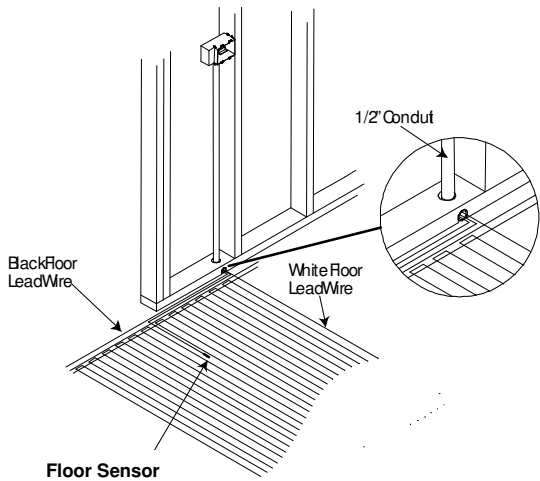


Diagram 5. – Conduit is required in certain jurisdictions. Please contact local authorities if this applies to your project.

FLOOR WARMING SYSTEM

COVERAGE (FT ²)			VOLTAGE	WATTS	AMPS	CATALOGUE #
2"	2 & 3"	3"				
12	15	17	120	140	1.2	FW12-120
18	23	27	120	215	1.8	FW18-120
23	29	34	120	275	2.3	FW23-120
36	45	54	120	440	3.7	FW36-120
41	51	61	120	500	4.2	FW41-120
52	65	78	120	625	5.2	FW52-120
65	81	98	120	785	6.5	FW65-120
75	94	113	120	900	7.5	FW75-120
84	105	125	120	1000	8.3	FW84-120
12	15	18	240	150	0.6	FW12-240
23	29	35	240	280	1.2	FW23-240
36	45	54	240	430	1.8	FW36-240
46	58	69	240	550	2.3	FW46-240
65	81	98	240	780	3.3	FW65-240
82	103	123	240	990	4.1	FW82-240
104	130	156	240	1250	5.2	FW104-240
117	146	175	240	1400	5.8	FW117-240
134	168	200	240	1600	6.7	FW134-240
150	188	225	240	1800	7.5	FW150-240
167	209	250	240	2000	8.3	FW167-240
184	230	275	240	2200	9.2	FW184-240



S.I.D.



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ACCESSORIES

- Spacing Strip** 7.6 metres (25' length)
- S.I.D.** Smart Installation Detector. A diagnostic time saving tool.
- SR-LV-B** Low voltage ThermaRay Comfort Controller with box ring to be used with an SRDP2 Distribution Panel
- ThermaRay Distribution Panels**
- SRDP2-10-10** 10 communication ports for controls & 10 relays
- SRDP2-10-20** 10 communication ports for controls & 20 relays
- SRDP2-20-20** 20 communication ports for controls & 20 relays

Conforms to UL SUB 1683
 and CSA STD C22.2 No 130

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